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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SIEMENS MEDICAL SOLUTIONS USA, INC.

Appeal 2008-4103
Application 10/671,086
Technology Center 3600

Decided: November 25, 2008

Before JAMESON LEE, SALLY G. LANE, and JAMES T. MOORE,
Administrative Patent Judges.

LEE, *Administrative Patent Judge.*

DECISION ON APPEAL

A. STATEMENT OF THE CASE

This is a decision on appeal by the real party in interest, Siemens Medical Solutions USA, Inc. (Siemens), under 35 U.S.C. § 134(a) from a final rejection of claims 37-49. Siemens requests reversal of the Examiner's rejection of those claims. We have jurisdiction under 35 U.S.C. § 6(b).

References Relied on by the Examiner

Alvord	5,586,153	Dec. 17, 1996
Schlyer	5,917,874	Jun. 29, 1999
Fujiwara	6,289,071	Sep. 11, 2001
Amini	6,917,044	Jul. 12, 2005

“Tantalum [¹⁸O] Water Target For the Production of [¹⁸F] Fluoride with High Reactivity for the Preparation of 2-Deoxy-2 [¹⁸F] Fluoro-D-Glucose” by N. Satyamurthy, Bernard Amarasekera, C. William Alvord, Jorge R. Barrio, and Michael E. Phelps, Molecular Imaging and Biology, January-February 2002, pp. 65-70, Vol. 4., No. 1 (**Satyamurthy**).

Admitted prior art appearing in Figures 1-3 and paragraphs 8-10 of the specification. (**APA**).

The Rejections on Appeal

The Examiner rejected claims 37, 38, 40-44, and 46-49 under 35 U.S.C. § 102(a) as anticipated by APA.

The Examiner rejected claims 37-49 under 35 U.S.C. § 102(b) as anticipated by Satyamurthy.

The Examiner rejected claims 37-49 under 35 U.S.C. § 103(a) as obvious over APA, Alvord, Fujiwara, Schlyer, Amini and Satyamurthy.

The Invention

The invention relates to a target assembly used with a particle accelerator for producing radioisotopes. The target assembly is characterized by cooling channels that are internal to a target body. (Spec. 1:¶ 3.)

Independent claim 37 is reproduced below (Claims App’x 13:1-12):

37. A target assembly for containing and cooling enriched water for the production of fluorine-18, comprising:

a target body;

a target chamber formed within said target body, said target chamber having a front window for exposing said chamber to a particle accelerator, a rear wall opposite said front window, said rear wall being sloped with respect to said front window, and a top wall connecting said rear wall to said front window; and

a first cooling channel having a first cooling fluid inlet at one end of said target body, a first cooling fluid outlet at another end of said target body, and a first cooling fluid channel conduit formed within said target body coupling said first cooling fluid inlet with said first cooling fluid outlet, said first cooling fluid channel conduit running along at least a portion of said rear wall and along a portion of said top wall.

B. ISSUES

1) Does APA taken alone disclose cooling channels that are within a target body?

2) Does Satyamurthy taken alone disclose a cooling fluid inlet formed at one end of a target body and a fluid outlet formed at another end of the target body?

3) Would the collective teachings of the cited prior art have led a person of ordinary skill in the art to incorporate cooling channels within the top and rear walls of a target body such as that disclosed by APA?

C. FINDINGS OF FACT

1. Siemens' specification describes that the cooling channels of the APA run along the outside surface of the target assembly. (Spec. 3:¶9.)

2. Siemens' specification also describes that the channels of the APA are along the circumference of the target assembly. (Spec. 3:¶9.)

3. Satyamurthy's identifies a "back end" and a "front end" as outer surfaces of a target body that are on opposite sides of one another. (Satyamurthy Figure 1.)

4. Satamurthy's inlet water tube and outlet water tube are concentric and both extend through the same opening in the back end of the target body. (Satamurthy Figure 1.)

5. Fujiwara discloses a positron emitter-generating unit 10 having a target body formed by three blocks 12, 13, 14. (Fujiwara 4:50-58; Figure 1.)

6. In Fujiwara, within the target body is a container 17 receiving a liquid that is exposed to a charged particle beam 11. (Fujiwara 4:59 to 5:2.)

7. In Fujiwara, also within the target body is a concave part 18 and cooling water feed pipes 19a, 19b. (Fujiwara 5:2-3.)

8. In Fujiwara, the concave part 18 lies along the back wall 16 of container 17 and receives cooling water from feed pipes 19a, 19b in order to cool the liquid within container 17. (Fujiwara 5:4-7.)

9. Amini discloses a target assembly having a target body 11 with a cooling flange 31. (Amini 6:4-28.)

10. In Amini, cooling flange 31 includes internal cooling pathways 32 that extend around a chamber 30. (Amini Figures 7-9.)

11. Amini expressly provides that (Amini 7:55-59):

In a target that is designed to operate with the above parameters and for a given beam power, the dimensions of the cooling flange 31 and the exact location of the coolant pathways should be chosen in order to keep the target temperature at a predetermined value [sic, value].

12. In APA, chamber 104 includes a rear wall that has a thickness extending from an interior sloped surface to an exterior vertical surface. (APA Figure 3.)

13. APA's chamber 104 also includes a top wall that has a thickness extending from an interior horizontal surface to an exterior horizontal surface. (APA Figure 3.)

D. PRINCIPLES OF LAW

While claim terms are given their broadest reasonably interpretation during examination, that interpretation must be consistent with the specification. *In re Prater*, 415 F.2d 1393, 1404 (CCPA 1969).

The test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Furthermore, a basis to combine teachings need not be expressly stated in any prior art reference. *In re Kahn*, 441 F.3d 977, 989 (Fed. Cir. 2006). There need only be an articulated reasoning with rational underpinnings to support a motivation to combine teachings. *Id.* at 988.

A combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739 (2007). If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Id.* at 1740. A person of ordinary skill in the art is also a person of ordinary creativity, not an automaton. *Id.* at 1742.

E. ANALYSIS

The anticipation rejection based on APA

The Examiner rejected claims 37, 38, 40-44, and 46-49 under 35 U.S.C. § 102(a) as anticipated by APA. We focus on the disputed limitations. Siemens contends that APA does not disclose a cooling fluid channel conduit that is formed within the target body as required by claim 37. (App. Br. 7:7-10.)

The Examiner's position is that the target body of APA includes each of the outer channels 202, 204, 304, 306, and 308. Based on that position, the Examiner found that APA satisfies the limitations of a fluid channel conduits that are formed "within" the target body. (Ans. 6:6-7; 7:4-12; 14:4 to 15:6.)

Siemens asserts that the cooling channels of APA are formed on an outside surface of the target body and are thus external and not "within" the body as required. (App. Br. 7:12-16; Reply Br. 2:9 to 3:10.)

Siemens' assertion is persuasive. Siemens' specification describes that the cooling channels of the APA run along the outside surface of the target assembly. (Spec. 3:¶9.) The specification also describes that the channels of APA are along the circumference of the target assembly. (Spec. 3:¶9.) The term "circumference" means "the external boundary or surface of a figure or object." *Merriam Webster's Collegiate Dictionary* 208 (10th ed. 1996). On the other hand, the specification describes the invention as including "internal cooling channels" that provide thermally optimized target chambers. (Spec 1:¶9.) The specification also describes that the external channels of the prior art known to Siemens provides only inefficient cooling. (Spec 3:¶11.)

While claim terms are given their broadest reasonable interpretation during examination, that interpretation must be consistent with the specification. *In re Prater*, 415 F.2d at 1404. Here, Siemens' specification distinguishes channels on an outside or external surface of the target body from channels internal to the target body. The term "internal" is synonymous with the claim term "within." In the context of Siemens' specification, it is not consistent to regard the meaning of "within" the body as including elements on an outside or external surface of the body. It is unreasonable to construe APA's external cooling channels as meeting the "within said target body" limitation.

We do not sustain the rejection of claims 37, 38, 40-44, and 46-49 under 35 U.S.C. § 102(a) as anticipated by APA.

The anticipation rejection based on Satyamurthy

The Examiner rejected claims 37-49 as anticipated under 35 U.S.C. § 102(b) as anticipated by Satyamurthy. We again focus on the disputed limitations. Siemens disputes that Satyamurthy satisfies the requirement of "a first cooling channel having a first cooling fluid inlet at one end of said target body, a first cooling fluid outlet at another end of said target body."

In addressing that requirement, the Examiner found that Satyamurthy discloses "a first cooling fluid inlet (6) at one end of said target body, a fluid outlet (7) at another end of said target body." (Ans. 8:20-21.) Evidently the reference characters "6" and "7" refer to a copy of Satyamurthy's Figure 1 that was annotated by the Examiner and mailed on June 13, 2006.

The annotated Figure 1 is reproduced below:

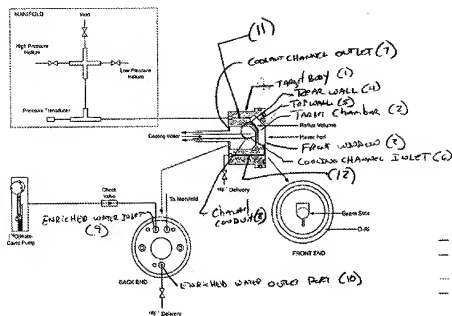


Figure 1 shows a schematic representation of Satyamurthy's target body.

"Coolant Channel Inlet (6)" and "Coolant Channel Outlet (7)" are some portion of concentric tubes that carry cooling water into and out of the target body. The "end" on which the fluid inlet "6" resides is identified as a portion that is in the interior of the cooling chamber in the target body. By way of explanation as to what constitutes an "end," the examiner states (Ans. 17:3-8):

As appellant so aptly states in his 10/[]13/2006 response page 9 "In the context of the specification, 'end' means simply at an outside surface of the target body[.]"

Satyamurthy's cooling channel inlet is indeed at one end of the target body and the outlet is at another end because they cannot occupy the same "end" in the broadest sense of the limitation "end" as set forth by Appellant.

Satyamurthy identifies that the “BACK END” and the “FRONT END” of its target body are outer surfaces that are on opposite sides of one another. (Satyamurthy Figure 1.) However, as shown in the Figure reproduced above, the Examiner found that the inlet “6” is on neither of those ends but is instead within the cooling water chamber at a mid-section of the target body. In the Examiner’s view, a structure which is at mid-section of a target body is on an “end” of that target body. The Examiner does not explain how the “end” of a body can be interpreted as including the mid-section of the body. That interpretation is unduly broad and consequently is unreasonable.

Moreover, even if the Satamurthy does have a fluid inlet at an end of the target body that still does not satisfy the claims. The claims require that a fluid inlet is at one end and that a fluid outlet is at another end. Satamurthy’s inlet and outlet water tubes are concentric and both extend through the same opening in a back end. (Satamurthy Figure 1.) Thus, the inlet and outlet tubes extend through the same end of the target body. As they are at the same end, the inlet and outlet are not at “one end” and “another end,” respectfully.

For all the foregoing reasons, we do not sustain the rejection of claims 37-49 under 35 U.S.C. § 102(b) as anticipated by Satyamurthy.

The obviousness rejection

The Examiner also rejected claims 37-49 under 35 U.S.C. § 103(a) as obvious over APA, Alvord, Fujiwara, Schyler, Amini and Satyamurthy.

The Examiner reasoned that even if APA’s cooling channels are not “within” the target body, it would have been obvious for one of ordinary skill in the art to modify APA’s target body to include channels within that

body. In support of that reasoning, the Examiner cited the collective teachings of the above-noted references. The Examiner explained that a person of ordinary skill would have reason to incorporate in APA internal cooling channels as taught by those references to prevent overheating through localized cooling of the target body. (Ans. 11:21 to 12:7.)

Siemens argues that APA does not recognize an overheating problem and a person of ordinary skill in the art would therefore not be motivated to combine the teachings of the prior art to remedy that problem. (App. Br. 10:19 to 11:9.)

Siemens' limited focus on what APA expressly discloses is misplaced. The test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. *In re Keller*, 642 F.2d at 425. Furthermore, a basis to combine teachings need not be expressly stated in any prior art reference. *In re Kahn*, 441 F.3d at 989. There need only be an articulated reasoning with rational underpinnings to support a motivation to combine teachings. *Id.* at 988.

Here, the additional references support the Examiner's reasoning that cooling channels are placed on the interior of a target body to provide localized cooling. We focus on the teachings of Fujiwara and Amini.

Fujiwara discloses a positron emitter-generating unit 10 having a target body formed by three blocks 12, 13, 14. (Fujiwara 4:50-58; Figure 1.) Within the target body is a container 17 receiving a liquid that is exposed to a charged particle beam 11. (Fujiwara 4:59 to 5:2.) Embedded within a wall of the target body is a concave part 18. (Fujiwara 5:2-3.) Concave part 18 lies along the back wall 16 of container 17 and receives cooling water from feed pipes 19a, 19b in order to cool the liquid within container 17.

(Fujiwara 5:4-7.) Concave part 18 is a cooling channel that is embedded within a wall of a target body.

Amini discloses a target assembly having a target body 11 with a cooling flange 31. (Amini 6:4-28.) Cooling flange 31 includes cooling pathways 32 that are embedded in walls that extend around a chamber 30. (Amini Figures 7-9.) Amini expressly provides that (Amini 7:55-59):

In a target that is designed to operate with the above parameters and for a given beam power, the dimensions of the cooling flange 31 and the exact location of the coolant pathways should be chosen in order to keep the target temperature at a predetermined value [sic, value].

A combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. *KSR*, 127 S. Ct. at 1739. If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Id.* at 1740. Furthermore, a person of ordinary skill in the art is also a person of ordinary creativity, not an automaton. *Id.* at 1742.

Here, APA's cooling channels, 102, 104, 202, 204, 302, and 304 function to cool a target liquid within chamber 104 but are located remotely from that chamber on an outside surface of the target assembly. (Spec 3:¶ 9.) However, Fujiwara and Amini teach that in target assemblies for producing radioisotopes, it was well known to embed cooling channels within a target body at locations chosen to maintain a target temperature. Applying those teachings to APA, a person of ordinary creativity would

have known to embed cooling channels within the rear and top walls of APA's target body in order to cool the inner target chamber 104.

Furthermore, embedding the cooling channels of APA within the rear and top walls of the target body satisfies the claim requirement that the channels run along portions of the rear and top wall. In APA, chamber 104 includes a rear wall that has a thickness extending from an interior sloped surface to an exterior vertical surface. (APA Figure 3.) Likewise, chamber 104 includes a top wall that has a thickness extending from an interior horizontal surface to an exterior horizontal surface. (APA Figure 3.) Once the cooling channels are embedded within the top and rear walls, those channels do run "along at least a portion of said rear wall" and run "along a portion of said top wall."

In light of the collective teachings of the prior art, the Examiner correctly determined that Siemens' claims are satisfied by the prior art. The Examiner's reasoning for embedding the cooling channels of the APA within the target body in order to obtain localized cooling is credible as it takes into account how a person of ordinary creativity would have viewed the combined teachings of the prior art. Siemens' argument directed to the express teachings of APA taken alone does not account for those combined teachings and does not undermine the Examiner's reasoning.

For all the foregoing reasons, we sustain the rejection of claims 37-49 under 35 U.S.C. § 103(a) as obvious over APA, Alvord, Fujiwara, Schyler, Amini and Satyamurthy.

F. CONCLUSION

1) APA taken alone does not disclose cooling channels that are within a target body.

2) Satyamurthy taken alone does not disclose a cooling fluid inlet formed at one end of a target body and a fluid outlet formed at another end of the target body.

3) The collective teachings of the cited prior art would have led a person of ordinary skill in the art to incorporate cooling channels within the top and rear walls of the APA's target body.

G. ORDER

The rejection of claims 37, 38, 40-44, and 46-49 under 35 U.S.C. § 102(a) as anticipated by APA is **reversed**.

The rejection of claims 37-49 under 35 U.S.C. § 102(b) as anticipated by Satyamurthy is **reversed**.

The rejection of claims 37-49 under 35 U.S.C. § 103(a) as obvious over APA, Alvord, Fujiwara, Schyler, Amini and Satyamurthy is **affirmed**.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

rvb

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